

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/019188

| A. CLASSIFICATION OF SUBJECT MATTER |           |           |           |            |           |
|-------------------------------------|-----------|-----------|-----------|------------|-----------|
| IPC 7                               | B29B15/10 | D06M15/55 | D06M13/11 | D06M13/196 | D06M11/52 |
|                                     | D06M11/09 | C08K9/04  | C08K7/24  | C09K9/02   | C01B31/02 |

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B29B D06M C08K C09K C01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.   |
|------------|--|-------------------------|
| X          | WO 02/060812 A (WILLIAM MARSH RICE UNIVERSITY; TOUR, JAMES, M; BAHR, JEFFREY, L; YANG,) 8 August 2002 (2002-08-08)<br>page 18, line 27 - page 20, line 14<br>-----       | 40-51,<br>66-71         |
| P,X        | WO 03/080513 A (THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA; JOHNSON, ALAN, T; WINE) 2 October 2003 (2003-10-02)<br>example 1<br>page 15, line 13 - line 19<br>-----  | 1-9,<br>40-49,<br>71,72 |
| E          | WO 2005/012171 A (WILLIAM MARSH RICE UNIVERSITY; BARRERA, ENRIQUE, V; ZHU, JIANG; ZHANG,) 10 February 2005 (2005-02-10)<br>example 4<br>paragraph [0077]<br>-----<br>-/- | 40-49,71                |

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

### ° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the International filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "8" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

20 April 2005

12 JUL 2005

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.    |
|----------|---|--------------------------|
| A        | SCHADLER L S ET AL: "Load transfer in carbon nanotube epoxy composites"<br>APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS, NEW YORK, US,<br>vol. 73, no. 26,<br>28 December 1998 (1998-12-28), pages 3842-3844, XP012021707<br>ISSN: 0003-6951<br>page 3842<br>-----<br>US 6 426 134 B1 (LAVIN JOHN GERARD ET AL)<br>30 July 2002 (2002-07-30)<br>examples<br>----- | 1-11,<br>14-51,<br>54-72 |
| A        |   |                          |

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### Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 12, 13, 52, 53 because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-72

#### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

Continuation of Box II.2

Claims Nos.: 12,13,52,53

Present claims 12, 13, 52 and 53 relate to methods and products defined by reference to desirable characteristics or properties, namely enhanced mechanical properties, increase in Young's modulus, increase in tensile strength, enhanced elongation-to-break, enhanced load transfer in the composite.

Claims 12, 13, 52 and 53 cover all methods and products having these characteristics or properties, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such methods and products. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the method and the product by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those claims which appear to be clear, supported and disclosed, namely claims 1-11, 14-51 and 54-72.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-72

Composites comprising functionalized carbon nanotubes integrated into an epoxy resin matrix;  
Method of producing said composites.

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2. claims: 73-90

Composites comprising carbon nanotubes, a fibrous material and a polymer matrix;  
Method of producing said composites.

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| Patent document cited in search report |    | Publication date |                                  | Patent family member(s)   |  | Publication date   |
|--|----|------------------|----------------------------------|---|--|--|
| WO 02060812                            | A  | 08-08-2002       | DE<br>GB<br>JP<br>WO<br>US<br>US | 10295944 T5<br>2389847 A<br>2004530646 T<br>02060812 A2<br>2005074390 A1<br>2005074613 A1 |  | 15-04-2004<br>24-12-2003<br>07-10-2004<br>08-08-2002<br>07-04-2005<br>07-04-2005 |
| WO 03080513                            | A  | 02-10-2003       | AU<br>WO                         | 2003218335 A1<br>03080513 A2  |  | 08-10-2003<br>02-10-2003   |
| WO 2005012171                          | A  | 10-02-2005       | WO                               | 2005012171 A2   |  | 10-02-2005   |
| US 6426134                             | B1 | 30-07-2002       |                                  | NONE  |  |  |